

**MARINE AIR GROUND TASK FORCE UNMANNED AIR SYSTEMS PROGRAM  
EXPEDITIONARY (MUX) Intelligence, Surveillance, and Reconnaissance (ISR) Payload  
Prize Challenge Official Rules**

**I. Prize Challenge Overview:**

The Naval Air Systems Command, Program Executive Office for Unmanned Aviation and Strike Weapons (PEO(U&W)), Multi-Mission Tactical Unmanned Air Systems Program (PMA-266) is coordinating a prize challenge related to modular Intelligence, Surveillance, and Reconnaissance (ISR) payloads in order to obtain information, performance capabilities, and technical data on mission system payload technologies to inform the development and acquisition strategy for the Marine Air Ground Task Force (MAGTF) Unmanned Aircraft System (UAS) Expeditionary (MUX) program.

The planned prize challenge represents part of the first phase of the MUX development strategy. The over-arching plan will include:

- Five separate first round prize challenges, four of which will be for individual mission payloads and one for system architecture designs. The Government may, at its discretion, provide selected payload designs to participants in the architecture design challenge for the purpose of informing the submission designs.
- A subsequent second round prize challenge for air vehicle designs that, at the discretion of the Government, integrate selected payloads and architecture designs from the first round of challenges.
- At the discretion of the Government, development of a prototype and fielding effort for selected products may follow.

The ISR mission system payload prize challenge aims to identify ISR mission system payloads that will 1) Maximize payload performance to meet or exceed MUX mission system desired payload performance levels, 2) Minimize mission payload Size, Weight, Power, and Cooling (SWaP-C) requirements, 3) Maximize mission system payload(s) modularity, 4) Minimize mission payload maintainability and sustainability requirements, 5) Maximize mission system payload reliability, 6) Maximize a mission system payload's ability to be reconfigured and/or upgraded to adapt to and address emergent threats to the Marine Air Ground Task Force (MAGTF) in highly contested environments, 7) Provide a mission systems model(s), and 8) Minimize implementation, and Operations and Support (O&S) cost(s).

**II. Prize Challenge Process:**

This Prize Challenge will be conducted in two phases: initial qualification and final submission evaluation. During the initial qualification phase, interested parties must submit an initial application as provided more specifically in Section III in order for the Government to determine whether the interested party is eligible to receive the Government-Furnished

Information and starter model that is required for participation in the final submission phase of the prize challenge.

Applications will be reviewed by the Government against the initial qualification criteria. Qualified participants will receive an invitation to participate in the final submission phase. Final submissions will be scored by a panel of judges using a standardized grading rubric, which will be provided to all participants along with the starter model. The scoring will be taken into consideration during the final submission evaluation, which shall be conducted in accordance with the evaluation criteria described in Paragraph IV.B below. Winners will be selected by the Government and notified. Cash prizes will be awarded for first place (\$700,000), second place (\$200,000), and third place (\$100,000).

At the Government's discretion, the Government may choose to award an Other Transaction Authority (OTA) award (under 10 U.S. Code, Section 2371 or 2371b) or a procurement contract for experimental purposes (10 U. S. Code, Section 2373) or a combination of awards under those authorities to any chosen participant in this Prize Challenge. In the case of an award under 10 U.S. Code, Section 2371b, a successful prototype project may result in the further award of a follow-on production agreement or contract without additional competition. In the case of an award under any of the authorities mentioned, significant quantities may be needed for field testing.

Participation in this Prize Challenge will be at participant expense. The Government will not be responsible for any costs incurred by the participant, to include submission costs, travel costs, technology demonstration or development costs or any associated costs.

### **III. Initial Qualification Phase:**

#### **A. Initial Application Requirements:**

During the initial qualification phase, participants must provide the following information. The participant's application shall not exceed 10 pages.

1. Name/s of company/ies or individual/s.
2. Address/es.
3. Social Security Number/s or Employer Identification Number/s.
4. If a company, CAGE or DUNS Code.
5. Point of Contact (POC) email and phone number.
6. Verification that the participant is either (1) an individual U.S. citizen or team of U.S. citizens or (2) an entity incorporated in and maintaining a primary place of business in the United States.
7. A description of the participant's previous experience and expertise designing modular payloads using an open systems approach (MOSA).
8. A description of the participant's experience and expertise with Model Based System Engineering (MBSE) tools.
9. A description of the participant's experience and expertise with modular open systems approaches.

10. A description of the participant's experience in collaborating with other companies to design, manufacture, and field systems.

Initial qualification applications shall be submitted to MUX\_Prize\_Challenge.fct@navy.mil. Initial qualification applications will be accepted until 11:59pm EST on 3 June 2019.

#### **B. Initial Application Evaluation:**

A review panel will evaluate information provided by the participants in the initial qualification phase in order to determine whether the participant is eligible to participate in the final submission phase. Specifically, the review panel will evaluate the following factors:

1. Whether the participant is (1) an individual U.S. citizen or team of U.S. citizens or (2) an entity incorporated in and maintaining a primary place of business in the United States. In order to participate in the final submission phase of the MUX ISR Payload prize challenge, the participant must be either (1) an individual U.S. citizen or team of U.S. citizens or (2) an entity incorporated in and maintaining a primary place of business in the United States.
2. Whether the participant is listed on the Excluded Parties List found on [www.sam.gov](http://www.sam.gov). In order to participate in the final submission phase of the MUX ISR Payload prize challenge, the participant must not be listed on the Excluded Parties List or have any active exclusions.
3. Information available in the Federal Awardee Performance and Integrity Information System (FAPIIS) for purposes of making a responsibility determination per FAR 9.104-1.
4. Experience and expertise in designing modular payloads using an open systems approach.
5. Experience and expertise with Model-Based Systems Engineering (MBSE) practices.
6. Experience and expertise with Modular Open System Approach (MOSA) principles.
7. Experience collaborating with other companies to design, manufacture, and field systems.

Based on this initial qualification phase evaluation, the Government may determine, at its sole discretion, that it will not invite the participant into the final submission phase.

Invitations to participate in the final submission phase will be issued via e-mail no later than 11:59pm EST on 18 June 2019. Responses to invitations will be due no later than 11:59pm EST on 25 June 2019. In these responses, the interested party must inform the Government of its intent to participate in the final submission phase of the challenge.

#### IV. Final Submission Phase:

##### A. Final Submission Requirements:

The final submission phase of the MUX ISR Prize Challenge will leverage model-based systems engineering (MBSE) methods. During the final submission phase, invited participants will be provided with a starter model generated in No Magic Cameo Enterprise Architecture™, Version 19.0 (Unified Architecture Framework (UAF)). The Government will provide instructions to access the starter model to participants with final submission phase invitations.

Participants will extend the starter model to substantiate their payload design concept and submit the extended model and a completed rubric that includes standardized scoring and weighting

criteria. Models must be developed and submitted in No Magic Cameo Enterprise Architecture™ V19.0 or later versions. Participants will also submit a written description of their model (including the specific information requested below) that includes mapping of requirements and capabilities to UAF views, and a list of supporting physics-based relationships and assumptions.

Table 1 includes the MUX operational and functional desired capabilities for all payloads currently contemplated by the Government. Participants in the final submission phase of the MUX ISR Prize Challenge will only extend the starter model for the ISR related requirements. The mission scenarios and environmental conditions in which the ISR payload is expected to perform will be provided to invited participants in the starter model. The participants shall include model domains, types, views as described in Table 2, and their locations in the final submission (as applicable to the participants' designs).

Diagram Name	Location (Within model)	UAF Type	DoDAF Type	Description
MUX Requirements	/Requirements/MUX Requirements	Requirements Table	Requirements Table	MUX Requirements table
MUX St-Tx	/Strategy/Strategic Taxonomy	St-Tx	CV-2	MUX capability composition
AEW St-Tx	/Strategy/Strategic Taxonomy	St-Tx	CV-2	AEW capability composition
Data Relay St-Tx	/Strategy/Strategic Taxonomy	St-Tx	CV-2	DR capability composition
EW / EA St-Tx	/Strategy/Strategic Taxonomy	St-Tx	CV-2	EW/EA capability composition
ISR St-Tx	/Strategy/Strategic Taxonomy	St-Tx	CV-2	ISR capability composition
MUX Strategic Environment	/Strategy/Strategic Parameters	Pm-En	SvcV-7	Threat characteristics and operating environment situation, weather, and terrain types
Operational Performers to Capabilities Mapping	/Operational/Operational Traceability	Op-Tr	CV-6	Matrix showing mapping between operational performers and capabilities

Operational Activities to Capabilities Mapping	/Operational/Operational Traceability	Op-Tr	CV-6	Matrix showing mapping between operational activities and capabilities
MUX Op-Tx	/Operational/Operational Taxonomy	Op-Tx	OV-2	Operational performer list
Execute AEW Mission	/Operational/Operational Processes	Op-Pr Flow	OV-5b	Operational process to execute an AEW mission
Execute Data Relay Mission	/Operational/Operational Processes	Op-Pr Flow	OV-5b	Operational process to execute an DR mission
Execute EW / EA Mission	/Operational/Operational Processes	Op-Pr Flow	OV-5b	Operational process to execute an EW/EA mission
Execute ISR Mission	/Operational/Operational Processes	Op-Pr Flow	OV-5b	Operational process to execute an ISR mission
AEW Op-Cn	/Operational/Operational Connectivity	Op-Cn	OV-3	Operational information flow
Data Relay Op-Cn	/Operational/Operational Connectivity	Op-Cn	OV-3	Operational information flow
EW / EA Op-Cn	/Operational/Operational Connectivity	Op-Cn	OV-3	Operational information flow
ISR Op-Cn	/Operational/Operational Connectivity	Op-Cn	OV-3	Operational information flow
Resources to Operational Activity Mapping	/Resources/Resources Traceability	Rs-Tr	SV-5	Matrix showing mapping between resources and operational activities
Payload Rs-Tx	/Resources/Resources Taxonomy	Rs-Tx	SV-2	SWAP-C limits and allocation
Functional Configuration Rs-Tx	/Resources/Resources Taxonomy	Rs-Tx	SV-2	Provides top-level capability descriptions of payload configurations (vendors extend)
Payload Functions Rs-Sr	/Resources/Resources Structure	Rs-Pr	SV-4	Provides top-level functions of payload
Payload Functions Example	/Resources/Resources Structure	Rs-Pr	SV-4	
AEW Rs-Sr	/Resources/Resources Structure	Rs-Pr	SV-4	Functional composition for AEW
Data Relay Rs-Sr	/Resources/Resources Structure	Rs-Pr	SV-4	Functional composition for Data Relay
EW / EA Rs-Sr	/Resources/Resources Structure	Rs-Pr	SV-4	Functional composition for EW / EA
ISR Rs-Sr	/Resources/Resources Structure	Rs-Sr	SV-4	Functional composition for ISR

Table 1. Starter Model Requirements Mapping

Specifically, the participants must provide an extension of the Government provided MUX MBSE model developed in No Magic Cameo Enterprise Architecture™, Version 19.0 or later versions. The participant's extension shall include models that describe the payload system functions and performance and any additional information needed to accurately describe the optimal payload. The participant shall provide the following model viewpoints:

<b>Services Domain:</b>	<b>Description</b>
Taxonomy (Sv-Tx / SvcV-1)	<b>Purpose:</b> show Service Specifications and required and provided service levels of these specifications required to exhibit a Capability and to support an Operational Activity.
Structure (Sv-Sr /Sv-Tx)	
Connectivity (Sv-Cn / SvcV-3/6)	
Processes (Sv-Pr / SvcV-4)	
States (Sv-St / SvcV-10b)	
(optional) Sv-Is (SvcV-10c)	
<b>Resources Domain:</b>	<b>Purpose:</b> capture a solution architecture consisting of resources, e.g. software, artifacts, capability configurations, natural resources that implement the operational requirements. Further design of a resource is typically detailed in SysML or UML.
Taxonomy (Rs-Tx / SV-1/2)	
Structure (Rs-Sr / SV-1/2)	
Connectivity (Rs-Cn / SV-3/6)	
Processes (Rs-Pr / SV-4)	
States (Rs-St / SV-10b)	
(optional) Rs-Is (SV-10c)	
Applicable Data Models (conceptual / logical) (DIV-1/2/3)	
Applicable parametrics / measurements	
Constraints (Rs-Ct / SV-10a)	
Traceability (Rs-Tr / SV-5)	

Table 2. Extended Starter Model Requirements

The participant shall provide the written description portion of the participant's submission in Microsoft Word 2016 using a Times New Roman 12-point normal font, single spaced with 1-inch margins all around and formatted for 8.5 x 11-inch paper. The written description shall be a maximum of 25 pages in length including text, supporting graphics, and any administrative content (e.g. cover page, table of contents, etc.). The participant may include 11 x 17 inch pages, but each 11 x 17 inch page will count as 2 pages towards the total page count.

The participant's written description shall include the following information:

- a. The participant shall describe the ISR payload system, its functions, levels of performance, and any known limitations or constraints (e.g. interface limitations, data transfer rates) of the system. It is recommended that graphics or charts be used where they can add value or simplify the explanation (e.g. Range vs. Power vs. Radar Cross Section). Additionally, the participant shall describe the ground station and data link challenges caused by the payload and make recommendations for onboard payload processing as a way to reduce required bandwidth.
- b. The participant shall describe the SWaP-C requirements of the recommended ISR payload.
- c. The participant shall describe relevant trade studies that were conducted during the payload selection process, including a description of the trades for the payloads that were examined, and why the recommended payload was selected.

- d. The participant shall describe the payload data bandwidth requirements.
- e. The participant shall describe their approach to modularity (hardware and software).
- f. For proposed mission system payloads that are below Technology Readiness Level (TRL) 9, the participant shall provide a development and risk burn down schedule that clearly indicates the time required for the proposed mission system payload(s) to obtain TRL 8 or higher.
- g. The participant shall identify the physical and logical (software) interfaces of the system. A “black box” representation of a component is allowed to protect intellectual property, but the interface shall be provided with sufficient detail to allow the Government to understand the functions, performance and data interfaces.
- h. The participant shall describe the payload’s Built in Test (BIT) and Inherent fault isolation operational architecture. The participant shall describe the capability of its system to achieve (a) C-BIT (Continuous BIT), (b) I-BIT (Interrupted/Intermittent BIT)  
(c) P-BIT (Power-on BIT). If data is available, provide metric values associated with:
  - i. Fault Detection Rate (the ratio of correct BIT detected failures divided by total number of system failures.)
  - ii. Fault Isolation Rate (The ratio of total number of failures correctly isolated to the faulty Weapon Replaceable Assemblies, either by BIT or prescribed maintenance procedures, divided by the total number of failures detected by BIT.)
  - iii. False Alarm (A false alarm is a condition where BIT indicates a failure when none has occurred. Mean Time Between False Alarm = total operating hours divided by the total number of false alarms)
- i. The participant shall provide the Mean Time Between Failure (MTBF) values associated with the proposed payload. The participant shall specify the source of the values (e.g., MIL-HDBK or other predictions, demonstrated lab or test results, fielded actuals from similar or legacy system) and the operational environment in which the MTBF values are rated in accordance with MIL-HDBK-217F to include operating temperature and any other relevant environmental stresses.
- j. The participant shall identify DoD Type/Model/Series (TMS) that currently employ the proposed payload including the length of time each TMS has utilized the payload.
- k. The participant shall describe Support Equipment/Test Sets required to handle, manage, and maintain the payload system, if known, delineating Common Support Equipment (CSE) and Peculiar Support Equipment (PSE).
- l. The participant shall provide the maintenance concept recommendations for the

payload system, describing the best way to manage the system in operation and in repair to minimize maintenance, sustainment, and Life Cycle Cost. The participant shall provide estimated Mean Time To Repair (MTTR) within each level of the maintenance cycle.

- i. The participant shall describe if the ISR mission system payload or individual components require periodic recalibration and whether or not these tasks can be performed while the payload is installed in the air vehicle, at the organizational level, or if the payload must be shipped off to a facility or location.
- m. The participant shall provide an estimated time to field the ISR mission system payload and justification for estimate.
- n. The participant shall describe the ability to accommodate configuration changes within existing physical dimensions for future mission growth.
- o. The participant shall discuss the ability to accommodate future mission capability that may require additional power, bandwidth, cooling, etc.

Within the written description, participants must address whether, once manufactured, the payload will comply with the following Federal Acquisition Regulation and Department of Defense Federal Acquisition Regulation Supplement requirements and if not, why:

- a. 52.204-23 Prohibition on Contracting for Hardware, Software, and Services Developed or Provided by Kaspersky Lab and Other Covered Entities
- b. 52.209-7004 Subcontracting with Firms that are Owned or controlled by the Government of a Country that is a State Sponsor of Terrorism
- c. 52.225-7001 Buy American and Balance of Payments Program- Basic
- d. 52.225-7002 Qualifying Country Sources as Subcontractors
- e. 52.225-7007 Prohibition on Acquisition of United States Munitions List Items from Communists Chinese Military Companies
- f. 52.225-7009 Restriction on Acquisition of Certain Articles Containing Specialty Metals
- g. 52.225-7012 Preference for Certain Domestic Commodities
- h. 52.225-7016 Restriction on Acquisition of Ball and Roller Bearings
- i.
- j. 52.225-7048 Export Controlled-Items
- k. 52.225-7052 Restriction on Acquisition of Certain Magnets and Tungsten

Within the written description, participants must also provide a rough order of magnitude (ROM) for the cost to develop the proposed payload and for the cost to produce the payload on a per unit basis.

The participant must also complete the standardized rubric in accordance with the instructions contained in the rubric and provide the completed rubric with its final submission.



Final submissions (completed Cameo™ models, the written descriptions and completed rubric) must be received by the Government no later than 3:00 pm Eastern Time (ET) on 23 September 2019.

For **UNCLASSIFIED** submissions, participants must provide two (2) copies of the final submission on DVDs or CDs via United States Postal Service or through a commercial carrier. Participants shall not send submissions via facsimile, electronically, nor hand carry. Submissions must be received by the Government by 3:00 pm ET on September 23, 2019 and packaged/addressed in accordance with the following instructions:

PROGRAM EXECUTIVE OFFICER  
ATTN: PMA 266 Multi Mission Tactical UAS  
MUX ISR Prize Challenge Submission  
Michael Treglia, MUX IPT Lead PMA 266 PEO (U&W)  
22707 Cedar Point Road BLDG 3261  
Patuxent River, MD 20670

For **CLASSIFIED** submissions, participants must provide two (2) copies of the final submission on CDs or DVDs via United States Postal Service or through a commercial carrier. Participants shall not send submissions via facsimile, electronically, nor hand carry. Submissions must be received by the Government by 3:00 pm ET on September 23, 2019 and packaged/addressed in accordance with the following instructions:

Mailing must be double wrapped:

Outer envelope address:  
PROGRAM EXECUTIVE OFFICER  
ATTN: SECURITY COORDINATOR PMA 266  
PEO (U&W)  
22707 Cedar Point Road, BLDG 3261  
Patuxent River, MD 20670

Inner envelope address:  
PROGRAM EXECUTIVE OFFICER  
ATTN: MUX AEW Prize Challenge Submission  
MUX IPTL Michael Treglia PMA 266  
PEO (U&W)  
22707 Cedar Point Road, BLDG 3261  
Patuxent River, MD 20670

Note Inner Envelope requires proper classification marking.

The final submission must also include a transmittal receipt list of the material transmitted.

Compliance with the submission timeliness requirements will be determined based on whether the final submission was received at the Government installation designated for receipt of proposals and was under the Government's control prior to the time set for receipt of

proposals.

If the Government is unable to access the information provided by the participant for any reason (including, but not limited to, malfunctioning CD or DVD, corrupted files, etc.) the Government may, at its discretion, disqualify the participant from the prize challenge or contact the participant for further information. Participants are permitted to provide additional copies of the CDs or DVDs as a backup.

**Participant submissions may contain classified and controlled unclassified information. Therefore, all participants must comply with the requirements of DoDM 5200.01 (all volumes) and NISPOM DoD 5220.22M (and any revision to those manuals) with respect to the data associated with this prize challenge, including, but not limited to, the requirements regarding the transmission, access, handling and storing of classified and controlled unclassified information. Supplemental agreements with the Government regarding classified information may be required prior to gaining access to classified information. Submissions must include all required elements. A submission may be disqualified if it fails to include all required elements. Submissions must be in English. The Government may give participants an opportunity to correct non-substantive errors in submission packages, when feasible and at its discretion. All submissions must be free of malware.**

#### **B. Final Submission Evaluation Criteria:**

During the submission period, a review panel will initially screen submissions for eligibility and compliance with the rules and terms and conditions of this challenge. A submission that fails to meet the eligibility and compliance criteria may be disqualified and may be ineligible for prizes.

After completing the initial screening, a review panel will perform a final evaluation of the remaining prize challenge submissions. The review panel will utilize the standardized scoring rubric provided to participants in the prize challenge invitation to evaluate the participant's submission. The rubric will be used to inform, but will not be determinative of, the Government's decision regarding the winners of the prize challenge. The rubric will include weighted evaluation factors such as, but not limited to:

1. SWaP-C requirements for designs.
2. Ability to meet performance desired capabilities.
3. Predicted Reliability (MTBF) and Maintainability.
4. Technology Readiness Level (TRL) of design.
5. Utilization of non-proprietary and widely used data models, communications protocols, software, and hardware interfaces.
6. Modularization of the design (to include software design and computing resources).
7. MBSE: Completeness and quality of Cameo™ model.

The Government will also consider the completed rubric provided by the participant, but is not bound to the scores the participant assigned to its submission.

The Government will also consider the participants' written description as part of the overall evaluation.

At its discretion, the Government may not evaluate and may disqualify a final submission if the participant fails to comply with the terms and conditions of this challenge, complete the model, rubric or provide the information requested in the written description or the Government may contact the participant for additional information.

The Government intends to award the prizes to the proposals that comply with the requirements of the prize challenge and, all information considered, provide the greatest overall benefit to the Government.

### **C. Definition of Terms**

For the purpose of this Prize Challenge, the following words have the following definitions:

Air Rotary Wing (ARW)

Definition in accordance with MIL- HDBK-217F.

Air Uninhabited Fighter (AUF)

Definition in accordance with MIL- HDBK-217F.

Air Inhabited Fighter (AIF)

Definition in accordance with MIL- HDBK-217F.

Air Inhabited Cargo (AIC)

Definition in accordance with MIL- HDBK-217F.

Air Uninhabited Cargo (AUC)

Definition in accordance with MIL-HDBK-217F.

Component

A product that is not subject to decomposition from the perspective of a specific application.

Interface

The functional and physical characteristics required to exist at a common boundary or connection between systems or items.

Interface Standard

A standard that specifies the physical, functional and operational relationships between various elements (hardware and software), to permit interchangeability, interconnection, compatibility and/or communications.

Interoperability

The ability of systems, units, or forces to provide data information, material, and services to and accept the same from other systems, units or forces, and to use the data, information, material, and services so exchanged to enable them to operate effectively together.

#### Intraoperability

The ability to (1) interchange and use information, services and/or physical items among components within a system (platform, program or domain) and (2) support the common use of components across various product lines.

#### Key Interface

A common boundary shared between system modules that provides access to critical data information, material, or services; and/or is of high interest due to rapid technological change, a high rate of failure, or costliness of connected modules.

#### Modular Design

A design: 1) where functionality is partitioned into discrete, self-contained modules that may operate as independent units and exhibit the characteristics of cohesiveness, encapsulation and self-containment; 2) that defines the interfaces between these modules in a precise manner; and 3) which permits alternated components or products as implementations of the system/design.

#### Modular Open System Approach

An integrated business and technical strategy that employs a modular design and, where appropriate, defines key interfaces using widely supported, consensus-based standards that are published and maintained by a recognized industry standards organization.

#### Module

An independently operable unit that is part of the total structure.

#### Mission System Payload Modularity

The ability to remove and replace integrated systems.

#### Multi-platform Contributor

The ability to share target location information with other aircraft.

#### Multi-platform Host Capable

The ability to receive target location information from other platforms and determine highly precise target location almost instantaneously.

#### National Image Interpretability Rating Scales (NIIRS)

A number which indicates the interpretability of a given image. The NIIRS concept provides a means to directly relate the quality of an image to the interpretation tasks for which it may be used.

### Open Architecture

An architecture that employs open standards for key interfaces within a system.

### Open Standards

Standards that are widely used, consensus based, published and maintained by recognized industry standards organizations.

### Open System

A system that employs modular design, uses widely supported and consensus-based standards for its key interfaces, and has been subjected to successful validation and verification tests to ensure the openness of its key interfaces.

### Single Platform Capability

The ability to collect target location data over a span of time and position and determine precise target location.

### Proprietary Standard

A standard that is exclusively owned by an individual or organization, the use of which generally would require a license and/or fee.

### Software Modularity

A software design which separates the software functionality into separate independent, interchangeable, modules such that each software module contains everything necessary to execute the desired functionality (i.e., separation of hardware and software through middleware).

### Software Portability

A software design which separates the software module system interface layer from the software process logic layer and enables the subject software module (and function) to be utilized in the same or similar software environments without modification of the module's source code.

### Standard

A document that establishes engineering and technical requirements for products, processes, procedures, practices, and methods that have been decreed by authority or adopted by consensus.

### Technology Readiness Level (TRL) Definitions

TRL 1: Basic principles observed and reported Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include paper studies of a technology's basic properties.

TRL 2: Technology concept and/or application formulated. Invention begins. Once basic principles are observed, practical applications can be invented. Applications are

speculative and there may be no proof or detailed analysis to support the assumptions. Examples are limited to analytic studies.

TRL 3: Analytical and experimental critical function and/or characteristic proof of concept. Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.

TRL 4: Component and/or breadboard validation in laboratory environment. Basic technological components are integrated to establish that they will work together. This is relatively “low fidelity” compared to the eventual system. Examples include integration of “ad hoc” hardware in the laboratory.

TRL 5: Component and/or breadboard validation in relevant environment. Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment.

TRL 6: System/subsystem model or prototype demonstration in a relevant environment. Representative model or prototype system, which is well beyond that of TRL 5, is tested in a relevant environment. Represents a major step up in a technology’s demonstrated readiness.

TRL 7: System prototype demonstration in an operational environment. Prototype near, or at, planned operational system. Represents a major step up from TRL 6, requiring demonstration of an actual system prototype in an operational environment such as an aircraft, vehicle, or space.

TRL 8: Actual system completed and qualified through test and demonstration. Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental test and evaluation of the system in its intended weapon system to determine if it meets design specifications.

TRL 9: Actual system proven through successful mission operations. Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation. Examples include using the system under operational mission conditions.

## **V. Terms and Conditions for the Prize Challenge:**

**These terms and conditions apply to all participants in the Challenge.**

**Agreement to Terms.** By responding to this announcement, the participant agrees to comply with and be bound by the rules (including these terms and conditions) of this prize challenge and

the decisions of the Government, which rules and decisions are binding and final in all matters relating to this challenge.

**Security Requirements.** By responding to this announcement, the participant agrees to comply with the DoDM 5200.01 (all volumes) and the National Industrial Security Program Operating Manual (DoD 5220.22-M) and any revisions to those manuals, as applicable.

**Participation by Government Support Contractors.** Government support contractors will assist in the review of any data provided by participants. A non-disclosure agreement (NDA) has been signed by the support contractors with the Government that precludes them from disclosing any proprietary data outside of the Government. If participants desire a separate NDA with the Government support contractors, participants should submit a NDA form, along with instructions, with their initial qualification application.

**Malware.** Each participant warrants that the submission is virus free and free of malware.

**Intellectual Property (IP) Rights.** The inclusion of proprietary information is not an inherent requirement of this challenge. The use of a modular open system approach (MOSA) should minimize the inclusion of participant proprietary information. Nevertheless, each participant (whether an individual, group or an organization) grants to the Government government purpose rights (GPR) (as defined in DFARS 252.227-7013 and DFARS 252.227-7014) in and to any technical data or computer software submitted by participant in this challenge and warrants that participant owns copyright to the submission, or, if the work is copyrighted by a 3<sup>rd</sup> party, that participant has obtained for the Government, a GPR license in such works. The license must grant to the Government and others acting on its behalf a fully paid, nonexclusive, irrevocable, worldwide license in any copyrightable works that the submission comprises, including the right to reproduce, prepare derivative works, distribute copies to the public and perform publicly and display publicly said copyrightable works. All such data shall be considered delivered upon submission to the Government and marked with GPR legends in accordance with DFARS 252.227-7013 and 252.227-7014. By participating in the Challenge, each participant warrants that there are no legal obstacles to providing the above-referenced nonexclusive licenses to the Government.

By participating in this Challenge, each individual (whether participating singly or in a group) warrants and assures the Government that any data used for the purpose of submitting an entry for this Challenge, were obtained legally through authorized access to such data.

By participating in this Challenge, each individual (whether participating singly or in a group) warrants and assures the Government that there are no known patents or known pending patents

on or related to the technology proposed within the submissions or, if there are known patents or known pending patents, that the patent holder grants to the Government a fully paid, nonexclusive, irrevocable license to use the patented material for the purpose of evaluating the participant's submission to this Challenge and for the purpose of informing the development and acquisition strategy for the MUX program, including incorporation of system capabilities and features identified in submissions into future requirements and specifications.

**Eligibility Requirements.** Eligibility is subject to verification by the Government before cash prizes are awarded. Participants (residents or entities) who are designated by the United States Treasury's Office of Foreign Assets Control are not eligible to receive any cash prize in the Challenge. Participants who are listed, or become listed, on the Excluded Parties List found on [www.sam.gov](http://www.sam.gov), have any active exclusions, or are otherwise unable to be deemed responsible in accordance with FAR 9.104-1 based on information available in FAPIIS, are not eligible to receive any cash prize in the Challenge.

Only U.S. citizens and entities incorporated in and maintaining a primary place of business in the United States are eligible to receive cash prizes in this Challenge.

Federal employees, including NAVAIR employees, and NAVAIR support contractors acting within the scope of their employment are not eligible to participate in the challenge. Likewise, members of their immediate family (spouses, children, step-children, siblings, step-siblings, parents, step-parents), and persons living in the same household, whether or not related, are not eligible to participate in any portion of this Challenge. Federal employees and contractors acting outside the scope of their employment should consult their ethics official and appropriate management before participating in the Challenge.

Individuals and organizations that are funded by NAVAIR to support MUX including, but not limited to, any Federally Funded Research and Development Centers and University Affiliated Research Centers (UARCs), or private-sector personnel whose scope of work includes MUX technical development or administrative support are not eligible to participate in the challenge.

**Taxes.** Tax treatment of prizes will be handled in accordance with U.S. Internal Revenue Service guidelines. The winners must provide a U.S. taxpayer identification number (e.g. a social security number) to receive the cash prize.

**Payment.** Participants selected as monetary prize winners must submit all required taxpayer identification and bank account information required to complete an electronic payment of the monetary prize. Failure to provide the Government required documents for electronic payment within 30 days of notification by the Government will result in a disqualification of the winning entry.

**Government Right to Cancel, Suspend or Modify Challenge.** The Government reserves the right, in its sole discretion, to cancel, suspend or modify the Challenge. These rules may be changed without prior notice, and all participants should monitor <http://www.navair.navy.mil/muxchallenge> for the latest information. The Government further



reserves the right to select no winners and award no prize money if the Government determines, in its sole discretion, that an award is not in the best interest of the Government.

**Decision Authority.** The PMA 266 Program Manager will be the final decision authority for all matters concerning the Challenge.

**Responsibility for Costs Incurred.** Nothing in these rules, to include information on the websites publicizing the award, may be interpreted as authorizing the incurrence of any costs, or modifying the statement of work or authorizing work outside the terms and conditions of any existing agreements or contracts with the Government.

Participation in this Prize Challenge is at participant expense. The Government will not be responsible for any costs incurred by the participant, to include submission costs, travel costs, technology demonstration or development costs or any associated costs.

**Release of Claims.** The participant agrees to release and forever discharge any and all manner of claims, equitable adjustments, actions, suits, debts, appeals, and all other obligations of any kind, whether past or present, known or unknown, that have or may arise from, are related to or are in connection with, directly or indirectly, this prize challenge or the participant's submission.

**Liability.** By participating in this challenge, the participant agrees to assume, and thereby has assumed, any and all risks of injury or loss in connection with, or in any way arising from participation in this challenge, or development of any submission.

**Indemnification.** The participant indemnifies the Government and its affiliates, directors, officers, employees against all liabilities, damages, losses, costs, fees (including legal fees), and expenses relating to any allegation or third-party legal proceeding to the extent arising from:

(A) ) the participant's acts or omissions in relation to the Challenge (including the participant's use or acceptance of any prize and the participant's breach of these Terms); and

(B) ) the participant's submissions violating any rights of any other person or entity or any obligation the participant may have with them.

**Compliance with Laws.** The participant agrees to follow and comply with all applicable federal, state and local laws, regulations and policies.

#### **Disclaimers.**

ALL CONTENT PROVIDED BY THE GOVERNMENT IS PROVIDED ON AN "AS IS" AND "AS AVAILABLE" BASIS. THE GOVERNMENT DISCLAIMS ALL REPRESENTATIONS AND WARRANTIES (EXPRESS OR IMPLIED), INCLUDING ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE GOVERNMENT IS NOT RESPONSIBLE FOR ANY INCOMPLETE,

FAILED, OR DELAYED TRANSMISSION OF YOUR APPLICATION INFORMATION OR SUBMISSIONS DUE TO THE INTERNET, INCLUDING INTERRUPTION OR DELAYS CAUSED BY EQUIPMENT OR SOFTWARE MALFUNCTION OR OTHER TECHNICAL PROBLEMS.

REFERENCE HEREIN TO ANY SPECIFIC COMMERCIAL PRODUCTS, PROCESS, OR SERVICE BY TRADE NAME, TRADEMARK, MANUFACTURER, OR OTHERWISE, DOES NOT CONSTITUTE OR IMPLY ITS ENDORSEMENT, RECOMMENDATION, OR FAVORING BY THE UNITED STATES GOVERNMENT.

**Severability.** If any term (or part of a term) of these terms or rules is invalid, illegal or unenforceable, the rest of the terms or rules will remain in effect.

**Translations.** In the event of any discrepancy between the English version of these terms and rules and a translated version, the English version will govern.

**Governing Law.** This prize challenge is subject to all applicable federal laws and regulations. ALL CLAIMS ARISING OUT OF OR RELATING TO THESE TERMS WILL BE GOVERNED BY THE FEDERAL LAWS AND REGULATIONS OF THE UNITED STATES OF AMERICA.

**Availability of Funds.** The Government's obligation for prizes under 10 U.S.C. 2374a is subject to availability of appropriated funds from which payment for prize purposes can be made. No legal liability on the part of the Government for any payment of prizes may arise unless appropriated funds are available to the United States Navy for such purposes.

## **VI. Points of Contact:**

**For technical questions related to MBSE processes, model descriptions, or evaluation criteria, please send an email to [MUX\\_Prize\\_Challe.fct@navy.mil](mailto:MUX_Prize_Challe.fct@navy.mil) with "ISR Technical Question" in the subject line.**

**For website application questions, please send an email to [MUX\\_Prize\\_Challe.fct@navy.mil](mailto:MUX_Prize_Challe.fct@navy.mil) with "ISR Application Question" in the subject line.**

**During the initial application phase, the Government will post all questions and responses on <http://www.navair.navy.mil/muxchallenge>. Contestants should expect that their questions and the Government's responses will be made available to all those accessing the website. After completion of the initial qualification phase, the Government will email all unclassified questions and responses to invited participants. Invited participants should expect that their questions and the Government's response will be made available to all invited participants.**